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# CENTRAL AMERICAN HIEROGLYPHIC WRITING.

BY

CYRUS THOMAS.

FROM THE SMITHSONIAN REPORT FOR 1903, PAGES 705-721  
(WITH PLATES I-III).



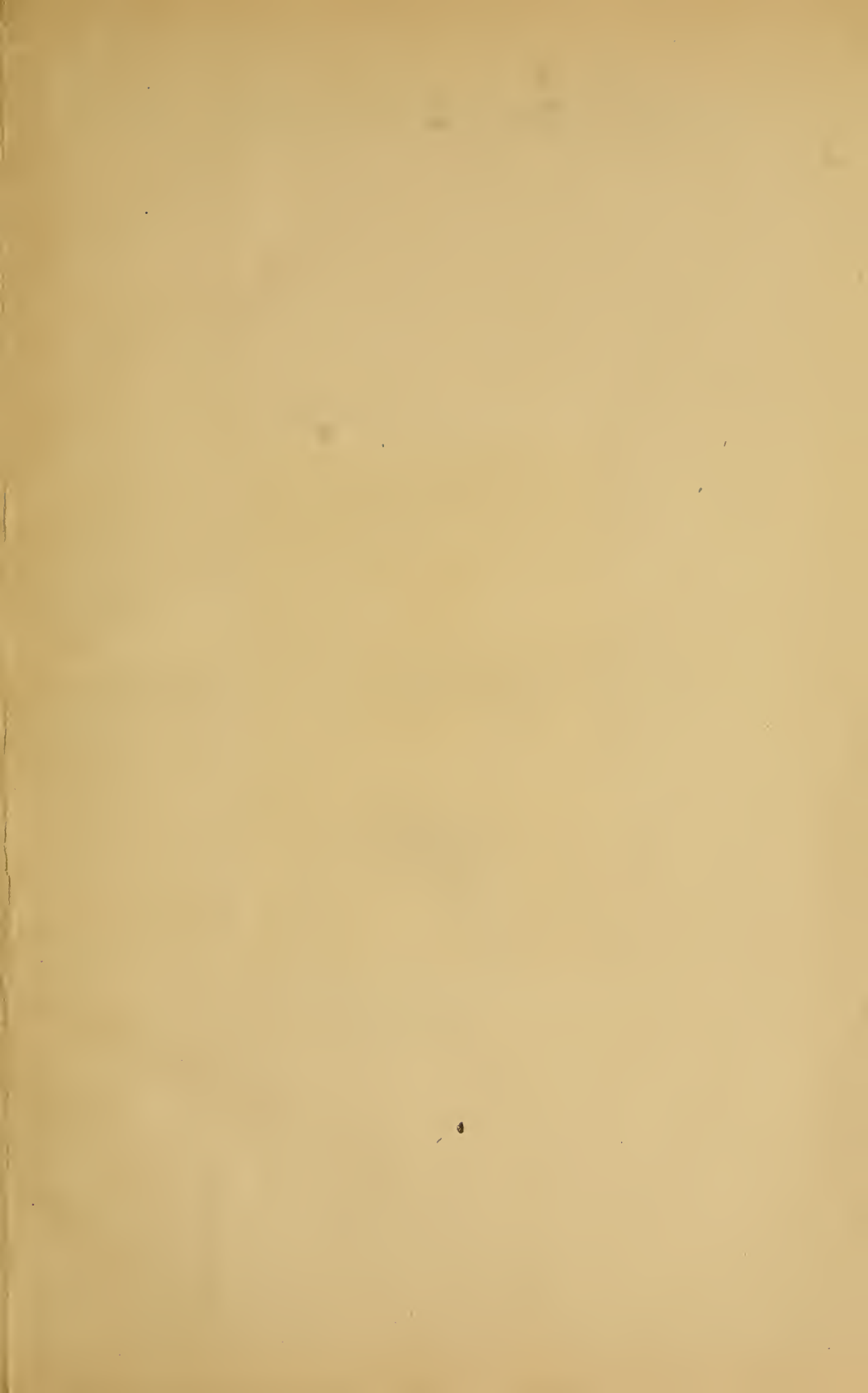
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The Mayan tribes of Yucatan, Chiapas, Guatemala, and western Honduras had reached at the time of the "discovery" the highest stage of native culture found in North America, except possibly in political organization, in which the ancient Mexicans, or Aztecs, excelled. This advance is shown by their architecture, as seen in the ruins of stately stone structures found throughout the region indicated, by their sculptures in stone and wood, by their complicated calendar system, by their arithmetical computations, and, above all, by the near approach they seem to have made to alphabetic writing, their system falling apparently but a step behind that of the ancient Egyptians. They engraved their peculiar hieroglyphic characters on stone tablets, on great sculptured monoliths, and on the walls and lintels of their buildings, painted them on plastered surfaces and on pottery, and wrote them in books. As most of these glyphs have rounded outlines, early authors imagined they resembled somewhat a section of a pebble, and the term "calculiform characters"—from the Latin *calculus*, "a pebble"—was for a time applied to them; but this is no longer in use, the term "hieroglyph," or simply "glyph," having replaced it. Where inscribed on stone or wood (for they are carved on both, but chiefly on the former) they are made to stand out in low relief, as may be seen in plate 1; but occasionally they were scratched or incised on shells and pottery, in which cases the glyphs are generally quite rude.

Inscriptions composed of these peculiar hieroglyphs have been found in the ruins of temples and of other structures in the States of Chiapas and Yucatan, Mexico, and in Guatemala and western Honduras. They are found in different situations, some of them on stone slabs set in the inner side of the walls of the temples, one of which, from Palenque, Chiapas, is among the collections of the Smithsonian Institution. A very extensive inscription is on the inside wall of the structure at Palenque, named by Stephens the "Temple of Inscriptions." At Copan, in western Honduras, and at Quirigua, in eastern Guatemala, the more important ones are on the sides and backs of the great stone statues which stood, and, in part, are yet standing, in what the native priests considered sacred precincts. The

lintels of the temple doors and, in a few instances, even the steps leading up to these edifices were utilized for this purpose. Casts and excellent photographs of most of these inscriptions have been made, thus bringing them in reach of students for investigation and study. Most of the ruins are found covered with a heavy forest growth, which has to be removed before exploration can be carried on. The present condition of one of the ruins at Chichen Itza, in Yucatan, named by Prof. W. H. Holmes the "Temple of Tables," is shown in plate II, where the growth has been partially removed.

The glyphs of the inscriptions, which were carved so as to stand out in low relief, are, as seen in plate I, somewhat square in outline, varying from  $3\frac{1}{2}$  to  $4\frac{1}{2}$  or 5 inches square. Each of these squares, which are as a rule in straight columns or lines, constitutes a hieroglyph or glyph, but they are usually composed of several elements or parts. This characteristic, which can not be easily explained in words, will be readily understood by reference to plate I. Some of these elements, as will be observed, consist of lines and dots, mostly at the left side or on the top of the glyphs. These are of special importance and will receive further notice. Some of the glyphs consist chiefly of an oval figure surrounded by a rim, as in the Egyptian cartouch. These inclosed characters, with probably a single exception, are symbols of Maya days. It is by means of these day symbols and the month symbols, which are also given in the inscriptions, that students ascertain that Maya people were the authors. Diego de Landa, a Spanish bishop, who went to Yucatan as a missionary in 1540, when persons were still living who could read the symbolic writing of the codices, has preserved in his work (*De las Cosas de Yucatan*) the forms of these symbols, each with its proper name attached, and this is the initial point of later investigations. As these names are those of the Mayan days and months, and the ruins are in the regions inhabited, so far as known, only by Mayan tribes, the remains as well as the inscriptions are attributed to these tribes.

However, Maya scribes were not limited in their symbolic or hieroglyphic writing to stone or wood, but wrote or painted their characters in manuscripts. Four examples of these manuscripts, or codices, as they are usually termed, remain. These are the *Codex Troanus* and *Codex Cortesianus*, thought by some authors to be parts of the same book, which are at Madrid; the *Codex Peresianus*, which is in Paris, and the *Codex Dresdensis*, the most important of the series, which is in the Royal Library at Dresden.

The first two strongly resemble each other, and were probably written in Yucatan, as they follow the calendar system of that region. The *Codex Peresianus* differs in some respects from all the others. The Dresden codex, which is of chief importance in studying the



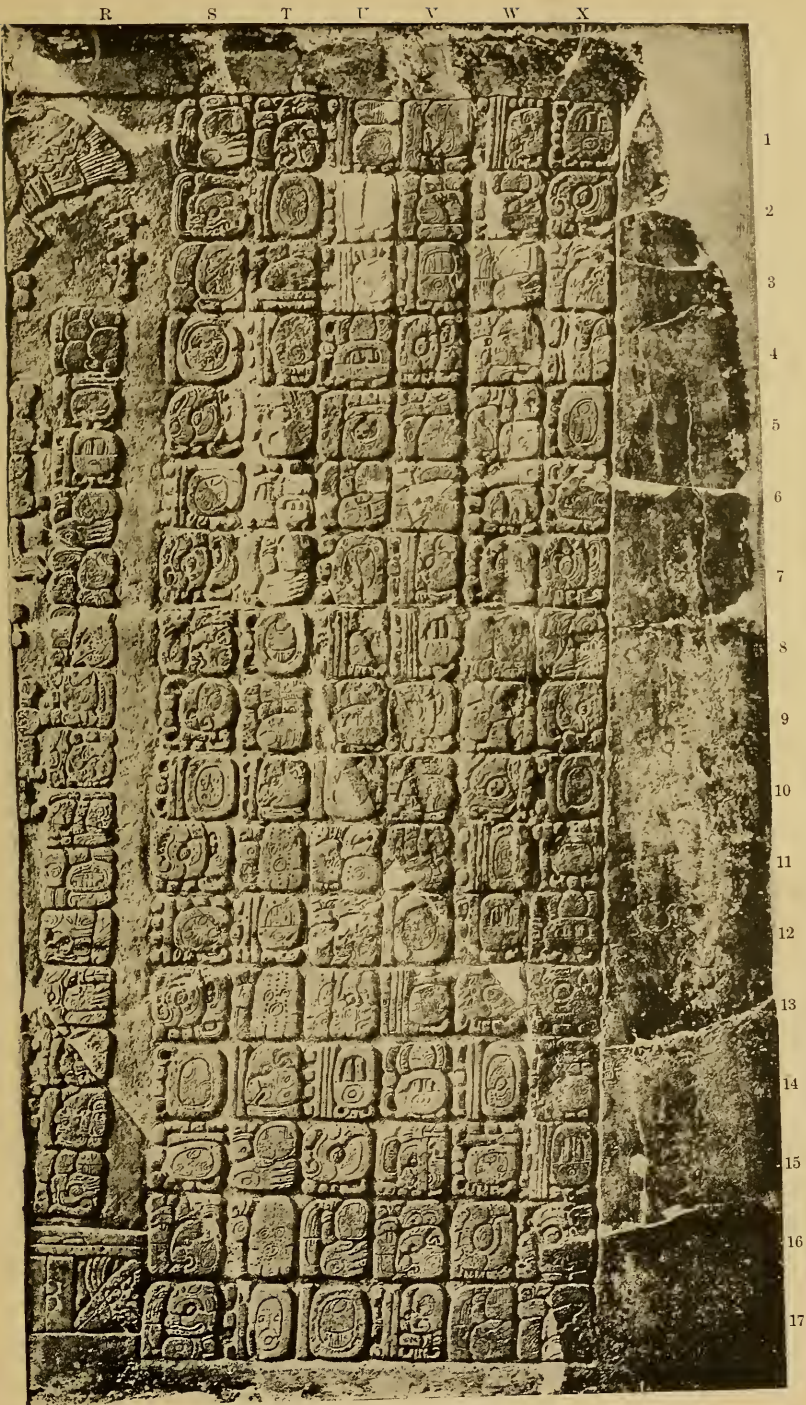


FIG. 1.—PALENQUE TABLET (IN SMITHSONIAN INSTITUTION).

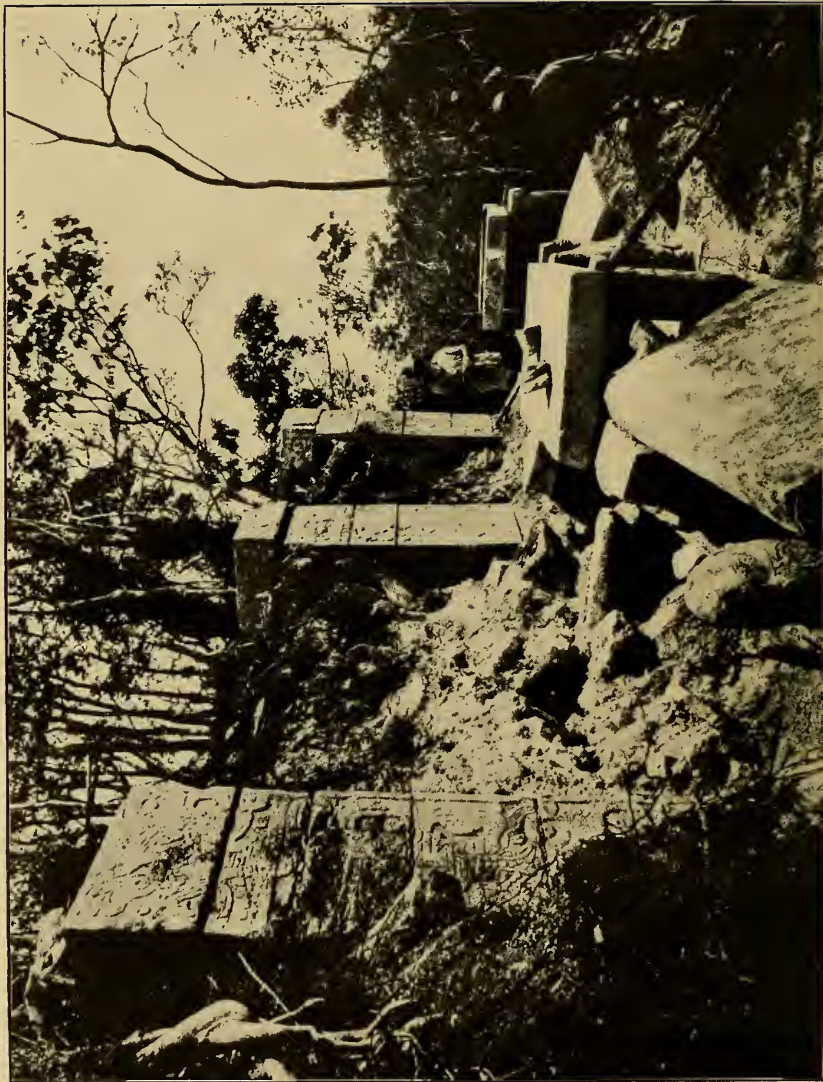


FIG. 2.—TEMPLE OF TABLES, CHICHEN ITZA.



written glyphs, agrees closely with the temple inscription in essential points, and was probably written in Chiapas or Guatemala.

These manuscripts are on a kind of paper made of the Maguey plant. A description of one is substantially a description of all, though the size and the number of pages vary. The Troano codex, which will be taken as an example, consists of a strip of maguey paper about 14 feet long and 9 inches wide, both surfaces of which were first covered with a white paint or varnish. The two-faces were then divided into spaces about six inches wide by black or red lines across the strip, in which spaces the characters and figures, in black, brown, red, and sometimes blue, were painted. The strip was then folded back and forth, like a pocket map, into 35 folds corresponding with the cross lines, representing, when pressed together, the appearance of an ordinary octavo volume. The glyphs and figures cover both sides of the paper, forming 70 pages, the writing and painting having been done apparently after the folding, as the folds do not interfere with it. A page is shown in facsimile in plate III.

The order in which this writing—if it may properly be so termed—is to be read was for many years a subject of discussion, some authors contending for one direction, as from left to right, or from the top downward, while some thought that the reading should be in the opposite direction. The proper order in which the inscriptions and the text, in part, of the manuscripts is to be read was first pointed out by the writer in 1882.<sup>a</sup>

In the inscriptions, which usually consists of two, four, or six columns, the columns are to be taken by twos or pairs from left to right, and the glyphs in each pair of columns are to be read from left to right and from top to bottom, in the order of the letters in the diagram (fig. 1). Where there is a single column the reading is from the top downward, and in single horizontal lines it is from left to right. The order in which the glyphs in the codices are to be taken, where there is a regular arrangement, is substantially the same. Although the columns may consist of but two lines in depth they are read in the order *a*, *b*, *c*, *d* in the diagram, at least in the Dresden, Troano, and Cortesian codices. In the Dresden codex, however, the numeral and time series, some of which are quite long, are in some cases to be read from right to left by lines across the page, the lines following one another from the bottom upward. Usually there are in the inscriptions, besides the glyphs, figures of priests and deities, and symbolic representations. A considerable portion of almost every page in the codices consists of

<i>a</i>	<i>b</i>
<i>c</i>	<i>d</i>
<i>e</i>	<i>f</i>
<i>g</i>	<i>h</i>

FIG. 1.

<sup>a</sup> Study of the Manuscript Troano.

pictographic representations such as are seen in the spaces below the text or lines of glyphs in plate III.

An important class of characters consists of those which as is now known denote numbers. These are of two quite distinct types; one, which is the usual form, found in both the inscriptions and the codices,.



FIG. 2.—Symbols for number 20.

but more abundantly in the latter, consists chiefly of dots and short lines. Thus . (one dot) signifies 1; .. (two dots) signify 2, and so on up to 4; 5 is indicated by a single short straight line, thus —; 10 by two similar lines, and 15 by three similar lines. To represent 6 the Maya scribes used a straight line and one dot  $\cdot$ ; for 7 a straight line and two dots, and so on to 9. Eleven was denoted by two straight lines and a dot; 12 by two straight lines and two dots, and so on to 19, which was represented thus  $\cdot\cdot\cdot\cdot$ . The lines and rows of dots are usually horizontal in the codices, the dots above as shown here, but in the inscriptions, where they are always attached to glyphs, are mostly perpendicular and placed at the left side, as at T 17 and U 17, plate I (the columns in the figure being denoted by letters at the top and the horizontal lines by figures at the side as in a reference map).

The numeral symbols of this type do not appear to have been used for a greater number than 19, other characters and relative position also, as will be shown, being used for higher numbers. Line

and dot numerals of two colors are quite common in the codices, the one class black, the other red; but the red characters are not used (except in a single unexplained instance) to denote a number greater than 13, and refer almost exclusively to the numbers given to the days, as explained on a subsequent page. This is one instance, at least, in which color

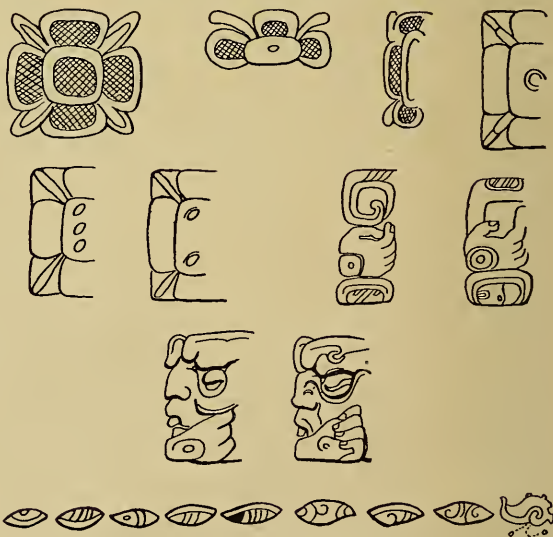


FIG. 3.—Symbols for 0, or full count.



Copy of Plate XXIX, Codex Troano  
(Brasseur de Bourbourg's Edition)





has special significance in these native manuscripts and suggests the probability that the different colors of the dots used to denote numbers in the Aztec codices in the time counts have a specific meaning, though this has not as yet been determined.

The number 20 is represented by several different forms, as shown in fig. 2. Those marked *a*, *b*, *c*, *d*, and *e* are found only in the codices; those marked *f*, *g*, *h*, and *i* occur chiefly in the inscriptions and are attached to the left side of the glyphs. Naught (0) is also represented in the inscriptions by characters numbered 1 to 10 in fig. 3, those numbered 1 to 8 being placed at the left side or on top of the glyph when used. Numbers 9 and 10 of the figure are used chiefly in double-face characters, as those seen in fig. 6. Number 11 of fig. 3 shows the characters for naught (0) used in the Dresden codex. The use of these symbols for naught is interesting, as it manifests a very strict adherence to mathematical steps in the representation of numbers, no blanks being allowed.

The Maya scribes were capable of carrying their numeration to a high number, and this they did in the codices, not with new or different symbols from those mentioned, but by relative position, on the same principle that we denote higher numbers than the Arabic digits by the position of these digits. Thus we increase the value of a number ten-fold in our decimal system at each step to the left, while in the vigesimal system, used by the Maya scribes, the numbers increased twenty-fold at each step, to indicate which they placed their digits, if we may so call them, in a column increasing from the bottom upward, so that a line and dot, mentioned above as denoting 6 if placed at the bottom,

as seen in the margin of the page, would denote 6, but if placed one step upward would denote 120, or 6 by 20, and one step higher would, according to their regular vigesimal system, be equal to 2,400, or 6 by 20 by 20, but in their time counts, which are the only numeral series in the third place, or third order of units, would be 6 by 20 by 18, making 2,160. The other steps upward

.	equal 2, 160
.	equal 120
.	equal 6

increase uniformly twentyfold. As they rise as high as the sixth step the value of the unit in the several steps or orders of units would be as shown in the column at the margin. As the day was the primary unit, a single dot in the sixth step or order would denote 2,880,000 days. A single dot in the fifth order would denote 144,000 days, and two dots in that place would denote twice that amount; three dots, three times that amount, and so on up to 19. This applies to each of these orders, except that in the second, where 18 is the multiplier. The highest number that can be inserted is 17. They are the same in principle as our compound denominate numbers—as pounds, shillings,

6th order	2,880,000
5th order	144,000
4th order	7,200
3d order	360
2d order	20
1st order	1

and pence—the highest number given in the pence place is 11, as 12 would be 1 shilling; and 19 the highest number to be given in the shilling place, as 20 would be £1. These series, or units of the various orders, can be reduced to the lowest denomination—which is days—in the same way that pounds, shillings, and pence are reduced to pence. Some of the numeral series in the Dresden codex amount when reduced to over 12,000,000 days.

As an example of their use of large numbers, one numeral series from plate LXIX of the Dresden codex is presented here, the numbers indicated by the numeral characters being placed at the left in parentheses and the equivalents in days at the right. The names placed at the extreme left (great cycle, cycle, etc.) are those adopted by Mr. Goodman for the respective orders:

			Days.
(great cycles)	(4) . . . .	equal	11, 520, 000
(cycles)	(5) _____	equal	720, 000
(katuns)	(19) <u>. . . .</u>	equal	136, 800
(ahaus)	(13) <u>. . .</u>	equal	4, 680
(chuens)	(12) <u>. .</u>	equal	240
(days)	(8) <u>. . .</u>	equal	8
Total.....			12, 381, 728

That is to say, 4 great cycles (or 4 units of the sixth order or position) equal 11,520,000 days; 5 cycles (or 5 units of the fifth order) equal 720,000 days; 19 katuns (or 19 units of the fourth order) equal 136,000 days; 13 ahaus (or units of the third order) equal 4,680 days, and so on.

The total amount expressed by this series is over 12,000,000 days. This is a large number to be handled by a pre-Columbian native, yet it can be demonstrated by actual count that the Maya scribe used this number correctly in a calculation.

Writers of the present day have adopted the simple method of expressing these numeral series thus (using the above example), position indicating the orders of units 4-5-19-13-12-8, ascending toward the left just as we may express £4, 12 shillings, and 6 pence, thus — 4-12-6.

A knowledge of the Maya numeral system and method of counting and expressing numbers, as given above, is absolutely necessary in the attempt to decipher the glyphs. It is also necessary to give here a brief notice of the Maya calendar, as a knowledge thereof is another requisite in deciphering. The process with the Maya glyphs, so far as it has been carried, is wholly different from the method pursued in deciphering Egyptian hieroglyphs and the cuneiform inscriptions of Assyria. There the phonetic value of the characters being ascertained, the combinations to form words can be followed and tested by the



result. In the Maya, with the few exceptions which will be mentioned later, the glyphs, so far as determined, are to a large extent symbols (not phonetic characters), used to denote numbers, days, months, etc. Hence the only means so far discovered by which to test an interpretation is the demonstrable relation of one character to another, thus: Having a symbol known to be that of Monday, another to be that for 7, another to be that for the month of March, and another for the number 120, and finding them placed in an inscription in the order: Monday, March 7, 120, and this followed by two imperfect or unknown characters and 5, thus —?—? 5, and having ascertained that the intermediate numbers, as the 120 in this case, indicate the number of



FIG. 4.—The symbols of the months.

days from the first date to a second, we count 120 days from Monday, March 7, which brings us to Tuesday, July 5. This gives us Tuesday and July as the two unknown or doubtful characters of the terminal date. Just as it is necessary, in the example given, to understand, in part at least, our Gregorian calendar, so is it necessary to understand the Maya calendar in attempting to decipher the Maya hieroglyphs.

The Maya years consisted uniformly of 365 days, no reference to or evidence of bissextile years (corresponding to our leap year) having been found in the codices or inscriptions. They were divided uniformly into 18 months of 20 days each, and a supplemental month of 5 days following the 18th. Each of these months had a name and a

symbol as shown in fig. 4. They always followed one another in the same order, the year uniformly beginning with Pop. The 20 days were also named, each having its appropriate symbol as shown in fig. 5. The order in which they followed one another was uniform, though the year did not always begin with the same day, the 5 in the supplemental month carrying the count forward 5 days each year. Although the days had their month numbers, as 1, 2, etc., to 20, as we say the



FIG. 5.—The symbols of the days.

fifth, sixth, and seventh day of the month, there was another numbering which applied to the days only. This, however, was from 1 to 13, beginning again with the unit. These numbers were prefixed to the days and followed in regular succession, no day being without its number. It follows from this method that a day bearing both the same name and the same number will not recur until 13 months have passed. This gives a cycle or period of 260 days, which appears to have been

more in use as a ceremonial or religious period, both among the Mayas and Mexicans, than the secular year of 365 days.

The order of the days and their numbering passed on from month to month and from year to year without a break or change in the regular succession. There is one series of 312 years in length in the Dresden codex, in which there is not a break in the succession, nor an indication of a bisextile year. In the series given above, also from the Dresden codex, which covers 34,059 years, 9 months, and 13 days, the date of the commencement and of the ending being given, which calculation shows to be correct, this is evidence that there can be no break or change in the succession of days, day numbers, or months. In this regularity of succession lies the possibility of determining the time series of the inscriptions and the codices.

In order to show what advance has been made in deciphering this ancient American writing, it is necessary to present examples from the codices and inscriptions that the reader may have the glyphs referred to before him, for words alone can not describe them so as to be understood. Beginning with the inscriptions, which appear to be older than the codices, attention is called to plate 1, showing the inscription on the Palenque tablet in the Smithsonian Institution. As a means of identifying the individual glyphs, a letter is placed over each column and a number at the side opposite each line, as in reference maps. R, S, T, U, V, W, X have been selected because they are the letters used for these particular columns in Doctor Rau's scheme.<sup>a</sup>

The column R being separated from the others, and a single column, it must be read from the top downward. Passing by this, attention is called to the other six, which are to be read two and two, beginning with the two at the left, going from the top downward, taking the glyphs alternately in the left of the two columns and then in the right, thus: First glyph, S 1 then T 1; next, S 2, T 2; then S 3 and T 3, and so on to the bottom. Then columns U and V are to be taken in the same order, and after these columns W and X. As it would require a somewhat extended study of the subject to follow out understandingly a complete explanation of the steps in the process of decipherment, an outline only of what has been accomplished in this direction can be given.

Reading down columns S and T in this manner, the first glyph which has been determined, or rather could be determined if uninjured, is T 2 (or the second in the T column), which, from the surrounding border or band and the number attached is known to be the symbol of a day, but on account of the imperfect markings or weathering of the face, is not indentifiable with certainty. Here, however, is an instance where a knowledge of the Maya calendar system

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<sup>a</sup> Palenque Tablet, in *Sm. Cont. Knowl.*, vol. xxii, p. 61.



becomes important, as it enables us to limit the investigation to one of four out of twenty days. As the next glyph which follows—that is, S 3 (or the third in the S column)—is the symbol for the month Pop (see fig. 4), the first month of the Maya year, and has attached to the left the symbol for 20 (similar to that shown at *i* fig. 2), it is evident that the day at T 2 is the 20th day of the month. As there are but four days (Ik, Manik, Eb, Caban—see fig. 4) in the calendar system used in the inscriptions that can fall on the 20th, it is evident that it must be one of these. The reader will observe by inspecting this glyph in the figure that there are two short perpendicular lines and a dot at the left; these denote that it is the day 11—?

Passing on to S 10, T 10, we find another date, the glyph S 10, being the symbol for the day 11 Lamat, and glyph T 10, the symbol for the month Xul with the numeral character for 6 at the left. For the days mentioned reference can be made to fig. 5 and for the months to fig. 4. However, for the illustration the names of the days and the months are not essential, but are added here to avoid using blanks. It will be observed that above and below the little dot in the numeral characters at the side of each of these glyphs is a little semicircle or crescent. These, which might be mistaken for number dots, have no significance, but are used to fill out the space or to guard the dot.

To be able to say that certain glyphs denote days, others months, and others numbers is one step in the process of decipherment, but the step is a comparatively short one unless their relation to one another and the object of their introduction into the inscription can be ascertained. This relation has been determined in part through intermediate number series. For example, by passing on to glyphs S 12 and T 12, we find the number series 9 days, 3 chuens (or units of the second order), and 13 ahaus (or units of the third order)—or 13-3-9—which, reduced to the lowest denomination, gives 4,749 days. Counting this number of days, according to the Mayan calendar, from 13 Lamat, 6 Xul, the date given in S 10, T 10, and mentioned above, we reach the date 2 Caban, 10 Xul, which is the date given two lines below at S 14 and T 14. That is to say, the number in the numeral series is the exact time included between the immediately preceding and the immediately following date. This is proof positive that there is a connection between the date at S 10 and T 10 and that at S 14, T 14. Nor does the connection series end here. Glyph S 15 is a short-number series of 123 days which connects the date 2 Caban, 10 Xul, of glyphs S 14, T 14, with the date 1 Ahau, 3 Zip of glyphs T 17 and U 1; or, omitting names, it connects the last preceding with the next following date.

Dropping from consideration the names of the days and months, introduced to avoid blanks or explanatory phrases, the important fact

remains that there is a connection between date glyphs that stand some distance apart.

It has been stated above that the Maya writing included two types of numeral characters. One of these, consisting of dots and short lines and the use of position, has been explained. The other type consisted of face characters, some of which are shown in fig. 6. In order



Symbol of second order of units (chuen).



Symbol of third order of units (ahau).



Symbol of fourth order of units (katun).



Symbol of fifth order of units (eyele).



Symbol of calendar rounds.

FIG. 6.—Face characters representing numbers.

to show how these are used, attention is called to fig. 7, which represents part of the inscription on the east side of Stela (or statue) F, at Quirigua, Guatemala, as designated by Mr. Maudslay, from whose great work (*Biologia Centrali-Americana*, "Archæology"), part XII, pl. 40, our figure is taken.

As seen in this illustration (fig. 7), there is at the top or beginning a large quadruple glyph, below which follow, in the order of the numbers 1, 2, 3, 4, 5, and 6 at the sides, six double glyphs, each composed



FIG. 7.—Inscription on Stela F, Quirigua. Copy from Maudslay's plate.

of two faces. There are other double-face glyphs below, but the six will suffice for illustration. Omitting from present consideration the large character at the top, attention is directed to these six glyphs, from which we may learn something of the mistakes made in the attempts at decipherment. A little more than a decade ago there was almost universal agreement among students of the Maya hieroglyphs that these face characters, especially those in commencing series, as shown in fig. 7, were symbols of deities. Subsequent investigation, however, has shorn them of their sacred character and reduced them to mere symbols representing numbers. The left face of each of these six double glyphs is one of the smaller numbers (1 to 19), which we have designated "Mayan digits;" for instance, the left face in glyph number 1 denotes 9; that in glyph 2 stands for 16; that in 3 for 10; that in 4 for 0 (naught), and that in 5 also stands for 0 (naught). These are the numbers prefixed respectively to the symbols of the orders of units in the inscription represented. The right face of number 1 denotes the cycle or fifth order of units; adding the prefix 9, the double glyph will signify 9 cycles or 9 units of the fifth order.

The right face of glyph 2 is the katun or fourth order of units; that of 3 the ahan or third order of units, etc. Glyph 6 is the day (1 Ahan) and glyph 12 the month (3 Zip), forming together the terminal date of the series.



Briefly stated, this series (fig. 7) and all those of like character are made up of numbers and dates, and not of deities, as was formerly supposed.

The differences in these face characters, by which their respective values are determined, have not in every instance been so clearly ascertained that they can be determined by inspection alone. In the left face of glyph 1 the circle of dots on the cheek forms the distinguishing characteristic for 9, but peculiar markings of others are less distinct. The face characters representing the orders of units, as the cycle, katus, etc., can be determined by position alone.

The great quadruple glyph at the top is the symbol for the sixth order of units (Goodman's "great cycle"), which seems to have represented the limit of Mayan time counts, although according to Doctor Brinton their numeration in the regular Maya number system was carried a step higher; and Goodman intimates that their time counts reached an additional step in the scale, amounting at the extreme to 280,800 years or 102,492,000 days. This large so-called "great cycle symbol," with the number characters and the immediately following date, form what Maudslay has termed an "initial series," as the large glyph is never found except at the commencement of an inscription.

The month symbol which helps to make up the date in this instance is somewhat distant from the day symbol, five compound glyphs intervening; nevertheless there is numerical evidence that the two are connected and that the date is part of the "initial series." There is also evidence that the initial series in the inscriptions at Copan, Quirigua, and some other localities where the number of cycles is 9, as in this case, start with the same date (4 Ahau 8 Cumhu), this date being apparently the beginning of an era with the priests and scribes of those sections. As this is but one instance of a number where the count in these initial series gives the proper terminal date in the inscription, the proof that they have been correctly interpreted seems to be complete. This conclusion necessarily carries with it the acceptance of the interpretation given the glyphs and also the calendar system as above explained, though the native priests appear to have purposely used characters which would be understood only by their own class.

The codices, as will be seen by referring to plate III, which is a facsimile of three of the four divisions of plate XXIX of the Codex Troano, contain a much larger proportion of pictographic representation than the inscriptions. Besides the pictures there are two classes of hieroglyphs; first, the ordinary numerals represented by dots and short lines, which are of two colors, black and red. The latter, which do not exceed 13 in value, are the numbers attached to or belonging to the days—the day, where the symbol is omitted, as in the lines of the alternate black and red numerals in this instance, being understood.

The column at the left side of the lowest division consists of the symbols of 5 days, which form the basis from which the count by the black and red numerals is made. The day columns for the two upper divisions are in a preceding plate, the line of numerals running through more than one plate.

The two lines of black glyphs running across the upper part of each division forms what may be termed the "text." These are read in this instance by groups of four, considering them two short columns, as those over the bird and personage in blue at the left side of the middle division, the order being the same as *a*, *b*, *c*, *d* in the diagram, fig. 1. But little progress has as yet been made in deciphering this so-called "text."

So far as the writer is aware, but three characters of the text of this plate have been determined save in the manner mentioned below. These are the symbols of three of the cardinal points, and are the first, third, and fifth glyphs in the upper line of the upper division, counting across from the left.

That the text in most instances contains reference to the figures below is quite evident. This is shown in plate III by the fact that some feature of the pictures is represented by one of the four glyphs which stand above it, as in the middle section the bird's head forms one of the glyphs over the figure in which the bird appears; and likewise the dog-like animal and worm in the same division are represented in the glyphs of the text above. These would therefore seem to be simple abbreviated pictographs or conventionalized figures and not in any sense phonetic characters. In the lower division of the same figure the three persons to the right are holding in their hands something like the symbol for the day Ik (fig. 5) (which signifies "wind" in the Maya language); the same symbol appears in the text above the head of each, but its signification in these places is unknown. We may surmise if we like, but the proof is wanting.

As the glyphs in the middle division of the figure, on which the persons and other forms are sitting, appear to represent something out of which plants can grow and has the elements of the symbol of the day Caban (see fig. 5), it is possible they denote earth (cab in Maya signifies "earth"). In the upper division the Kan-like symbols (one of which a bird is pecking and another is bitten by a little quadruped) probably represent grains of corn, supposed to be in the ground, the two to the right throwing out sprouts. If this interpretation be correct, this entire plate probably has reference to the cultivation of corn and the dangers it is subject to. However, from what has been stated, the reader can judge as to the portion of this codex that has been determined with certainty, which is but little, and as to what is as yet but theoretical. Of the text proper, scarcely anything, as before stated, has been absolutely determined. This failure to decipher is attribu-



table in part to the fact that where the suggested signification may be absolutely correct, no means, except where numbers come into play, has been found to verify the conclusion.

From what has been stated and the examples presented from the inscriptions and codices, it is apparent; notwithstanding the number of glyphs whose signification has been ascertained, that practically no progress has been made in determining the phonetic equivalents of these characters. In other words, no satisfactory evidence has yet been presented to show that any of these glyphs are phonetic, although there is sufficient evidence that the language used was Maya. The nearest approach to proof on this point is in regard to a few symbols, such as that for the month Tzotz (fig. 4). The usual form of the glyph is the conventionalized head of the leaf-nosed bat, and in one instance (Stela D, Copan) the full form showing the wings and body is introduced as the symbol of the month. As tzotz is the Maya word for bat, it is possible the word relates to the symbol. Pop, the name of another month, signifies in Maya literally a mat, or rug, the reference being apparently to the structure, and the chief feature of the symbol for the month consists usually of interlacing like basket work. These and a few other instances of similar character constitute the strongest indications of phoneticism that have been observed, but as the elements of these glyphs found where the character can not be determined by other means furnish no aid in deciphering them the inference of phoneticism is doubtful. It is possible that some of the characters are phonetic, yet it must be admitted that no satisfactory proof thereof has yet been presented, although the author, with others, thought but a few years ago that continued investigation would soon produce this evidence.

The general purport of the inscriptions has not been ascertained with certainty, yet the fact that half of them belong to the classes heretofore described—the numeral symbols, calendar symbols, etc.—leads to the conclusion that they contain little, if anything, relating to the history of the tribes by whom they were made.

The indications that the Maya priests, by whom these inscriptions were doubtless designed, if not carved, recognized a prime or ruling era from which a large portion of the initial time series are counted, are so strong that most recent authorities who have devoted attention to the subject have concluded to adopt the theory, at least tentatively. We might hope that further research will prove that this has some relation to Maya history were it not that the beginning was placed about four thousand years prior to the time when the inscriptions were made—a date so remote as to preclude the supposition that it related to any noted event in the history of the tribes.

The progress made in deciphering the text of the codices is less than that made in interpreting the inscriptions, as the number of numeral, time, and other symbols in the former which have been determined is less in proportion to the whole than in the latter. However, this proportion is limited to the text of the codices and does not include the accompanying numeral and day series. Nevertheless, the aid furnished by the figures which are introduced, together with the relation a large portion of the time series bear to the text and figures, often furnish some indication of the general purport of the plates, but all attempts to give the details have thus far failed, from the lack of means of verification. Two or three of the plates of the Dresden codex are devoted entirely to a single numeral series. These can be followed throughout and the obliterated characters in most cases restored; in fact, some of them seem to be little else than the steps of the calculation made by the original scribe. Possibly their relation to adjacent series may yet be ascertained and their signification determined. This has been accomplished in regard to the series running through plates 46-50 of the Dresden codex.<sup>a</sup>

A brief answer to the question, What has the progress thus far made in deciphering this hieroglyphic writing added to our knowledge of the ancient history, life, and attainments of the Maya people? may properly close this brief article.

That it has shown a greater advance in culture along particular lines than was previously known is certainly true. Much has been ascertained from the remains of stone structures and the sculptured designs thereon in regard to the advance of the Mayas along certain lines of art and their ability to form and to carry out comprehensive plans and designs; but the study of the hieroglyphs has brought to light evidence of mental capability and attainments of a higher grade in some respects than has been shown elsewhere. It would be somewhat difficult for anyone at the present day, except a mathematician, to calculate back 34,059 years 9 months and 13 days from a particular day in the present year, using our Gregorian calendar, and determining the exact month, day of the month, and day of the week that will be reached. Yet this was accomplished by the Maya priests according to their calendar and with their cumbersome vigesimal system. Not only was it necessary to reduce the several orders of units (cycles, katuns, etc.) to the lowest denomination, but the sum had to be changed into years, months, and days. The modern mathematician has his books of tables, and his paper, ink, and pen and pencil, and a numeral system that is simple and easy to handle. How did the Mayan scribe solve the same problem with the means he had at hand? The study of the glyphs has brought these facts and this question before us.

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<sup>a</sup>The Maya Year, by Cyrus Thomas, Bureau Am. Ethn., 1894.

The steps which have been made in decipherment have made it evident that the Mayan priests had an understood era or a well-understood point of departure in their time counts. They also indicate that the inscriptions at Copan and Quirigua were carved in substantially the same period, the range, judging by the terminal dates of the initial series, being comprised in two hundred years. But the attempts to connect the dates in the Mayan inscriptions and codices with dates in the Gregorian calendar have failed, though greater success has attended the efforts in this direction with the Aztec count. Another fact made prominent by the study of these glyphs is the uniformity in the system, art, and culture, along the lines indicated, in Chiapas, Guatemala, western Honduras, and with slight exceptions in Yucatan. The collection of hieroglyphs from the inscriptions of the latter section are not sufficient to determine whether they follow the Troano and Cortesian codices or the system of the inscriptions of Chiapas and Guatemala.

The study of the inscriptions and codices has made it evident that no adjustment between the Maya year and the solar year was made in any way that appears in the record or interfered with the calendar count. Although the efforts at interpretation have succeeded in few if any instances in tracing the connection throughout long inscriptions, they have made it evident that there is connection, or, in other words, that these inscriptions (with possible exceptions) are continuous records from the initial glyph to the end, though it may consist of little else than number series and time counts. Both inscriptions and codices evidently relate very largely to ceremonies and priestly duties, more particularly the latter.

Another result of the study of the hieroglyphs is the clear distinction it has established between the Maya and the Aztec symbolic writings.

The Maya writing has been studied to a greater or less extent by Leon de Rosny, Hyacinth de Charencey, and Brasseur de Bourbourg, of France; P. Schellhas, E. Forstemann, and Eduard Seler, of Germany; A. P. Maudslay, of England; Charles Rau, Edward Holden, D. G. Brinton, J. T. Goodman, Marshall H. Saville, Cyrus Thomas, G. B. Gordon, and C. P. Bowditch, in the United States.

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